IN THE CLAIMS:

Please amend claims 11 and 16-20; and add new claims 22 and 23 as follows. Note that the remaining claims are unamended, but are reproduced below for the Examiner's convenience and reference.

1. PREVIOUSLY CANCELED.

2. PREVIOUSLY CANCELED.

3. The substrate processing system of claim 11 further comprising a computer processor communicatively coupled to said impedance monitor so that said computer processor receives as an input the measured impedance level of said plasma.

4. The substrate processing system of claim 3 further comprising a variable capacitor electrically coupled to said chamber and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable capacitor to vary the impedance of said plasma in response to an output of said impedance monitor.

5. The substrate processing system of claim 3 further comprising a pressure control system configured to control a pressure level within said chamber and controllably coupled to said processor wherein said processor controls said pressure control system to vary the pressure within the chamber in response to the measured impedance level of said plasma.

6. The substrate processing system of claim 3 wherein said processor controls said plasma power source to vary the power applied to the plasma in response to the measured impedance level of said plasma.

7. RESTRICTION REQUIREMENT.

8. RESTRICTION REQUIREMENT.

9. RESTRICTION REQUIREMENT.

10. RESTRICTION REQUIREMENT.

11. (Amended) A substrate processing system comprising:

a deposition chamber comprising a reaction zone;

a substrate holder that positions a substrate in the reaction zone;

said substrate holder comprising a low frequency (LF) electrode;

a gas distribution system that includes a gas inlet manifold for supplying one or more process gases to said reaction zone;

said gas inlet manifold comprising a high frequency (HF) electrode;

a plasma power source for forming a plasma within the reaction zone of said deposition chamber; and

an impedance monitor electrically coupled to said high frequency electrode to measure the impedance at the HF electrode and said low frequency electrode to measure the impedance at the LF electrode.

12. The substrate processing system of claim 11 further comprising a variable capacitor electrically coupled to said LF electrode and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable capacitor to vary the impedance of said plasma in response to an output of said impedance monitor.

13. The substrate processing system of claim 11 further comprising an impedance tuner coupled in series to said pedestal.

14. The substrate processing system of claim 13 wherein said impedance tuner is coupled between said pedestal and a low frequency RF generator.

15. PREVIOUSLY CANCELED.

16. (Twice amended) **[The]** A substrate processing system **[of claim 4 further]** comprising:

a deposition chamber comprising a reaction zone;

a substrate holder that positions a substrate in the reaction zone;

said substrate holder comprising a low frequency (LF) electrode;

a gas distribution system that includes a gas inlet manifold for supplying one or more process gases to said reaction zone;

said gas inlet manifold comprising a high frequency (HF) electrode;

a plasma power source for forming a plasma within the reaction zone of said deposition chamber;

an impedance monitor electrically coupled to said high frequency electrode and said low frequency electrode;

a computer processor communicatively coupled to said impedance monitor so that said computer processor receives as an input the measured impedance level of said plasma;

a variable capacitor electrically coupled to said chamber and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable capacitor to vary the impedance of said plasma in response to an output of said impedance monitor; and

a matching network coupled to a high frequency RF generator and said gas manifold, wherein said matching network has capacitors that are different than said variable capacitor.

17. (Amended) A substrate processing system comprising:

means for introducing one or more process gases into a reaction zone of a substrate processing chamber;

means for forming a dual frequency plasma from said one or more process gases;

means for maintaining the reaction zone at deposition conditions suitable to deposit a layer from said one or more process gases;

means for monitoring an impedance level of said dual frequency plasma; and

means for adjusting deposition conditions in the reaction zone in response to said impedance level.

18. (Twice amended) A substrate processing system as set forth in claim 17 wherein said means for adjusting deposition conditions comprises a variable capacitor electrically coupled to said processing chamber to vary the impedance of said dual frequency plasma.

19. (Amended) The substrate processing system of claim **[12]** 14, wherein said impedance tuner includes a variable capacitor.

20. (Twice amended) **[The]** A substrate processing system **[of claim 19 further]** comprising:

a deposition chamber comprising a reaction zone;

a substrate holder that positions a substrate in the reaction zone;

said substrate holder comprising a low frequency (LF) electrode;

a gas distribution system that includes a gas inlet manifold for supplying one or more process gases to said reaction zone;

said gas inlet manifold comprising a high frequency (HF) electrode;

a plasma power source for forming a plasma within the reaction zone of said deposition chamber;

an impedance monitor electrically coupled to said high frequency electrode and said low frequency electrode, said impedance monitor including a variable capacitor;

a variable capacitor electrically coupled to said LF electrode and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable capacitor to vary the impedance of said plasma in response to an output of said impedance monitor; and

a matching network coupled between said low frequency RF generator and said variable capacitor, wherein said matching network includes capacitors that are different than said variable capacitor.

21. The substrate processing system of claim 11, further comprising a high frequency power supply coupled to said high frequency electrode and a low frequency power supply coupled to said low frequency electrode.

22. (New) The substrate processing system of claim 11 wherein the impedance monitor comprises a first impedance probe connected to the HF electrode and a second impedance probe connected to the LF electrode.

23. (New) The substrate processing system of claim 4 further comprising an RF matching network electrically coupled to the chamber, and wherein the variable capacitor is separate from the matching network.

REMARKS

Claims 3-6, 11-14, and 16-23 are pending. Claims 11 and 16-20 have been amended to more particularly point out and distinctly claim Applicants' invention. New claims 22 and 23 have been added. The specification has been amended to correct informalities. No new matter has been introduced.

Applicants note with appreciation the indicated allowability of claims 16 and 20 if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 16 and 20 have been rewritten accordingly. Therefore, Applicants believe claims 16 and 20 are allowable.

Claims 3, 4, 6, 11-14, 19, 22, and 23

Claims 11-14, 3, 4, 6, 19 and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Salimian et al. (USP 5,656,123) in view of Patrick et al. (USP 5,474,648) and Kinoshita et al. (USP 5,795,452), Maher et al. (USP 5,248,371), and Ohmi (USP 5,272,417).

Applicants respectfully submit that independent claim 11 is patentable over the cited references because, for instance, they do not teach or suggest an impedance monitor electrically coupled to the high frequency (HF) electrode to measure the impedance at the HF electrode and to the low frequency (LF) electrode to measure the impedance at the LF electrode. Support for this feature of claim 11 is found, for instance, in the specification at page 25, line 30 to page 26, line 4.

As the Examiner recognizes, Salimian et al., Ohmi, Maher et al., and Kinoshita et al. do not teach an impedance monitor. The Examiner alleges that Patrick et al. teaches an impedance monitor. Patrick et al., however, merely discloses a power sensor (202) for measuring the RF power delivered to the plasma chamber (104) (col. 7, lines 14-15). Patrick et al. states that the voltage, current, phase, and impedance of the plasma chamber electrode may